

MEANS FOR SOLVING PROBLEM

[0006] A stirling engine of the present invention which solves the abovementioned problems is characterized in that a high temperature section and a member connecting the high temperature section and a low temperature section are formed of different materials and are integrally bonded to each other to configure the stirling engine, the high temperature section being formed into an integral structure by means of a heat resistant/high heat conductive material having high heat resistance property and high heat conductivity, and the member connecting the high temperature section and the low temperature section being made up of a member which contacts with a flow of working gas, and being formed of a heat resistant/low heat conductive material having low heat conductivity. Furthermore, other stirling engine of the present invention is characterized in that a high temperature section and a member connecting the high temperature section and a low temperature section are formed of different materials and are integrally bonded to each other to configure the stirling engine, the high temperature section being formed by integrally molding an expansion space head portion and a high-temperature side heat exchanger main body with the same heat resistant/high heat conductive material having high heat resistance property and high heat conductivity.

[0007] As the heat resistant/high heat conductive material, a ceramics selected from silicon carbide ceramics, silicon nitride ceramics, aluminum nitride ceramics, or alumina ceramics, or a functionally gradient material of these ceramics and metal can be suitably employed. The member for connecting the high temperature section and the low temperature section is preferably formed of a heat resistant/low heat conductive material having low heat conductivity. As the heat resistant/low heat conductive material, a ceramics selected from silicon oxide, cordierite, mica, aluminum titanate, or quartz ceramics, or a functionally gradient material of these ceramics and metal can be suitably

employed.

[0008] The abovementioned stirling engine is not limited in the shape thereof, thus this stirling engine can be applied to any of a  $\beta$  type stirling engine in which a displacer piston and a power piston are disposed in the same cylinder, a  $\gamma$  type stirling engine in which a displacer piston and a power piston are disposed independently in different cylinders, or an  $\alpha$  type stirling engine having two independent pistons, which are, an expansion piston disposed in an expansion cylinder and a compression piston disposed in a compression cylinder.